



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2012-1327; Directorate Identifier 2012-NE-47-AD; Amendment 39-17478; AD 2013-12-01]**

**RIN 2120-AA64**

**Airworthiness Directives; Rolls-Royce plc Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** We are adopting a new airworthiness directive (AD) for all Rolls-Royce plc (RR) model RB211 Trent 768-60, 772-60, and 772B-60 turbofan engines. This AD was prompted by low-pressure (LP) compressor blade partial airfoil release events. This AD requires a one-time ultrasonic inspection of LP compressor blades that had accumulated more than 2,500 flight cycles (FC) since new. We are issuing this AD to prevent LP compressor blade airfoil separations, engine damage, and damage to the airplane.

**DATES:** This AD becomes effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. The Director of the Federal Register approved the incorporation by reference of certain publications listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** The Docket Operations office is located at Docket Management Facility, U.S. Department of Transportation, 1200 New Jersey Avenue SE., West Building Ground Floor, Room W12-140, Washington, DC 20590-0001.

**Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov>; or in person at the Docket Operations office between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Operations office (phone: 800-647-5527) is provided in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

**FOR FURTHER INFORMATION CONTACT:** Robert Green, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7754; fax: 781-238-7199; email: [robert.green@faa.gov](mailto:robert.green@faa.gov).

**SUPPLEMENTARY INFORMATION:**

**Discussion**

We issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that would apply to the specified products. That NPRM was published in the Federal Register on January 31, 2013 (78 FR 6749). That NPRM proposed to require a one-time ultrasonic C-scan inspection of LP compressor blades that have accumulated more than 2,500 FC since new. The European Aviation Safety Agency (EASA) subsequently superseded EASA AD 2012-0247, dated November 20, 2012, by issuing EASA AD 2013-0060, dated March 11, 2013, to include a re-inspection requirement for certain LP compressor blades that were not inspected correctly.

The new mandatory continuing airworthiness information (MCAI) states:

Low-Pressure (LP) compressor partial aerofoil blade release events have occurred in service on RR Trent 700 engines. While primary containment of the released sections has been achieved in each case, some of the releases did exhibit secondary effects that are considered to present a potential hazard. Previously, expeditious actions by RR have mitigated the risks presented by these effects, by removal from service of batches of LP compressor blades. However, some causal factors still exist that are not fully understood.

This condition, if not detected and corrected, could lead to LP compressor blade release with possible consequent loss of the engine nose cowl, under cowl fires and forward projection of secondary debris, possibly resulting in damage to the aeroplane and/or injury to persons on the ground.

To mitigate the risk of further partial fan blade release events, RR issued Non-Modification Service Bulletin (NMSB) RB.211-72-G872, providing instructions for an ultrasonic inspection of the affected LP compressor blades to detect subsurface anomalies in the aerofoil and, depending on findings, replacement of LP compressor blades.

To address this potential unsafe condition, EASA issued AD 2012-0247 to require a one-time inspection of the affected LP compressor blades.

Since that AD was issued, a population of LP compressor blades have been identified as incorrectly inspected and therefore require re-inspection. Consequently, RR issued NMSB RB.211-72-H311 to provide the instructions for this re-inspection.

For the reason described above, this AD retains the requirements of EASA AD 2012-0247, which is superseded, and adds, for the affected group of LP compressor blades, a one-time re-inspection.

## **Comments**

We gave the public the opportunity to participate in developing this AD. We considered the comments received.

### **Request to Change Summary**

RR requested that we change the Summary to state that the AD would require a one-time ultrasonic inspection of LP compressor blades (without being specific to C-scan). The reason for this request is that RR issued Revision 2 to NMSB RB.211-72-G872, dated March 8, 2013, which added phased array as an alternative ultrasonic technique to C-scan.

We agree. We changed the AD Summary to state: “This AD requires a one-time ultrasonic inspection of LP compressor blades that had...”

### **Request to Change Discussion**

RR requested that we change the Discussion to note that EASA AD 2012-0247, dated November 20, 2012, was superseded by EASA AD 2013-0060, dated March 11, 2013, which includes a re-inspection requirement for certain LP compressor blades that were not inspected correctly.

We agree. We referenced EASA AD 2013-0060, dated March 11, 2013 in the Discussion and Related Information paragraphs of this AD.

### **Request to Change Relevant Service Information**

RR requested that the Relevant Service Information paragraph be changed because they issued NMSB RB.211-72-G872, Revision 2, dated March 8, 2013. This NMSB adds phased array ultrasonic inspection as an on-wing or in-shop alternative to the C-scan inspection technique. Also, because certain LP compressor blades were not inspected correctly in accordance with RR NMSB RB.211-72-G872, Revision 1, dated July 2, 2012, RR issued NMSB RB.211-72-H311, dated March 8, 2013, to require re-inspection of blades identified by serial number (S/N). The accomplishment instructions and compliance period for NMSB RB.211-72-H311, dated March 8, 2013, are identical to those of NMSB RB.211-72-G872, Revision 2, dated March 8, 2013. Blades inspected

to NMSB RB.211-72-H311, dated March 8, 2013, do not then need inspection to NMSB RB.211-72-G872, Revision 2, dated March 8, 2013.

We partially agree. We agree that RR updated its service information. We do not agree that the Relevant Service Information paragraph be changed, because that paragraph only exists in the proposed AD (78 FR 6749, January 31, 2013). We did not change the AD.

#### **Request to Change AD Requirements Statement**

RR requested that we replace the requirements statement, of inspections specific to C-scan, with a statement requiring a one-time ultrasonic inspection of LP compressor blades (without being specific to C-scan).

We agree. We changed the AD Summary to state that the AD requires a one-time ultrasonic inspection of LP compressor blades that had accumulated more than 2,500 FC since new.

#### **Request to Change Compliance Time**

RR requested that the compliance time be changed from within 500 FC, to within 500 FC or 10 months, whichever is earlier. RR stated that this change is necessary to ensure compliance within a reasonable period of time.

We agree that a calendar end date is appropriate for AD management, and for that purpose, we agree 10 months is appropriate. We changed the AD to include the 10-month compliance end date.

#### **Request to Change Actions and Compliance**

RR requested that paragraph (e) of the AD be changed to reflect the revised inspection methods issued in RR NMSB RB.211-72-G872, Revision 2, dated March 8, 2013, to include a re-inspection requirement for certain blades provided by NMSB RB.211-72-H311, dated March 8, 2013, and to eliminate the requirement to remove the LP compressor blades. RR stated that these changes were needed because the revised

inspections in their service information adds phased array ultrasonic inspection and on-wing inspection instructions. RR NMSB RB.211-72-H311 introduces a re-inspection requirement for blades that were previously inspected incorrectly. The on-wing phased array ultrasonic inspection added by NMSB RB.211-72-G872, Revision 2, dated March 8, 2013, and included in NMSB RB.211-72-H311, does not require removal of the blades from the engine for inspection.

We agree. We changed paragraph (e) of this AD to state the following:

For engines with LP compressor blades that have 2,500 FC or more since new or since last inspection using RR NMSB RB.211-72-G702, dated May 23, 2011, perform an ultrasonic inspection of each compressor blade within 500 FC or within 10 months after the effective date of this AD, whichever is sooner. Use paragraphs 3.C through 3.H of RR NMSB RB.211-72-G872, Revision 2, dated March 8, 2013, to do the inspection. You may do the on-wing phased array ultrasonic inspection added by NMSB RB.211-72-G872, and included in NMSB RB.211-72-H311, without removing the blades from the engine for the inspection.

We added a Credit for Previous Actions paragraph (g) of this AD, which states that you may take credit for the ultrasonic C-scan inspection of each LP compressor blade if you performed the inspection before the effective date of this AD using RR NMSB RB.211-72-G872, dated April 3, 2012, or Revision 1, dated July 2, 2012.

#### **Request to Change Actions and Compliance**

RR requested that the Actions and Compliance paragraph be changed from "...do not install on an engine any LP compressor blade..." to "...do not install on an engine any replacement blade...". RR stated that the purpose of this change was to avoid confusion in the case that the blades are removed for routine maintenance such as re-lubrication of the blade root.

We partially agree. We agree that blades removed for routine on-wing

maintenance such as the re-lubrication of the blade roots should not be subject to the installation prohibition if they are within the compliance period interval. We do not agree with the use of the word “replacement” as it is ambiguous. We changed the Installation Prohibition paragraph (f) of this AD to read: “After the effective date of this AD, do not install, on any engine, any LP compressor blade that has 2,500 FC or more since new or since last inspection using RR NMSB RB.211-72-G702, dated May 23, 2011, unless the LP compressor blade has passed the ultrasonic inspection required in paragraphs (e)(1) or (e)(2) of this AD. LP compressor blades that are removed for routine on-wing maintenance such as blade root re-lubrication that will subsequently be reassembled into the engine are not subject to this Installation Prohibition.”

### **Conclusion**

We reviewed the available data, including the comments received, and determined that air safety and the public interest require adopting the AD with the changes described previously. We determined that these changes will not increase the economic burden on any operator or increase the scope of the AD.

### **Costs of Compliance**

We estimate that this AD will affect 56 engines installed on airplanes of U.S. registry. We also estimate that it will take about 38 hours per engine to comply with this AD. The average labor rate is \$85 per hour. Based on these figures, we estimate the cost of the AD on U.S. operators to be \$180,880.

### **Authority for This Rulemaking**

Title 49 of the United States Code specifies the FAA’s authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. “Subtitle VII: Aviation Programs,” describes in more detail the scope of the Agency’s authority.

We are issuing this rulemaking under the authority described in “Subtitle VII, Part A, Subpart III, Section 44701: General requirements.” Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

We determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska to the extent that it justifies making a regulatory distinction, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

We prepared a regulatory evaluation of the estimated costs to comply with this proposed AD and placed it in the AD docket.

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## **Adoption of the Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new AD:

**2013-12-01 Rolls-Royce plc:** Amendment 39-17478; Docket No. FAA-2012-1327; Directorate Identifier 2012-NE-47-AD.

#### **(a) Effective Date**

This airworthiness directive (AD) becomes effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

None.

#### **(c) Applicability**

This AD applies to all Rolls-Royce plc (RR) model RB211 Trent 768-60, 772-60, and 772B-60 turbofan engines.

#### **(d) Reason**

This AD was prompted by low-pressure (LP) compressor blade partial airfoil release events. We are issuing this AD to prevent LP compressor blade airfoil separations, engine damage, and damage to the airplane.

#### **(e) Actions and Compliance**

Unless already done, do the following actions.

**(1) Inspection of LP Compressor Blade On-Wing or In-Shop**

(i) For engines with LP compressor blades that have 2,500 flight cycles (FC) or more since new or since last inspection using RR Non-Mandatory Service Bulletin (NMSB) RB.211-72-G702, dated May 23, 2011, perform an ultrasonic inspection of each LP compressor blade within 500 FC or within 10 months after the effective date of this AD, whichever is sooner.

(ii) Use paragraphs 3.C through 3.H of the Accomplishment Instructions of RR NMSB RB.211-72-G872, Revision 2, dated March 8, 2013, to do the inspection.

(iii) You may do the on-wing phased array ultrasonic inspection added by NMSB RB.211-72-G872, Revision 2, dated March 8, 2013, and included in NMSB RB.211-72-H311, without removing the blades from the engine for the inspection.

**(2) Re-Inspection of LP Compressor Blade Identified by Serial Number (S/N)**

(i) For engines with LP compressor blades installed and identified by S/N in Appendix 1 of RR NMSB RB.211-72-H311, dated March 8, 2013, and that have, on the effective date of this AD, accumulated 2,500 FC since new or since last inspection using RR NMSB RB.211-72-G702, dated May 23, 2011, perform an ultrasonic inspection of each LP compressor blade.

(ii) The inspection, either on-wing or in-shop, must be performed within 500 FC or 10 months, whichever is sooner, after the effective date of this AD.

(iii) Use paragraphs 3.C through 3.H of the Accomplishment Instructions of RR NMSB RB.211-72-H311, dated March 8, 2013, to do the inspection.

**(f) Installation Prohibition**

(1) After the effective date of this AD, do not install, on any engine, any LP compressor blade that has 2,500 FC or more since new or since last inspection using RR NMSB RB.211-72-G702, dated May 23, 2011, unless the LP compressor blade has passed the ultrasonic inspection required in paragraphs (e)(1) or (e)(2) of this AD.

(2) LP compressor blades that are removed for routine on-wing maintenance such as blade root re-lubrication that will subsequently be reassembled into the engine are not subject to this Installation Prohibition.

**(g) Credit for Previous Actions**

You may take credit for the ultrasonic C-scan inspection of each compressor blade if you performed the inspection before the effective date of this AD using RR NMSB RB.211-72-G872, dated April 3, 2012, or Revision 1, dated July 2, 2012.

**(h) Alternative Methods of Compliance (AMOCs)**

The Manager, Engine Certification Office, FAA, may approve AMOCs for this AD. Use the procedures found in 14 CFR 39.19 to make your request.

**(i) Related Information**

(1) For more information about this AD, contact Robert Green, Aerospace Engineer, Engine Certification Office, FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803; phone: 781-238-7754; fax: 781-238-7199; email: robert.green@faa.gov.

(2) European Aviation Safety Agency AD 2013-0060, dated March 11, 2013, pertains to the subject of this AD. You may examine this AD on the Internet at <http://ad.easa.europa.eu/ad/2013-0060>.

(3) RR Non-Mandatory Service Bulletin (NMSB) RB.211-72-G702, dated May 23, 2011, which is not incorporated by reference in this AD, can be obtained from Rolls-Royce plc using the contact information in paragraph (j)(3) of this AD.

**(j) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Rolls-Royce plc Non-Modification Service Bulletin RB.211-72-H311, dated March 8, 2013.

(ii) Rolls-Royce plc Non-Modification Service Bulletin RB.211-72-G872, Revision 2, dated March 8, 2013.

(3) For Rolls-Royce plc service information identified in this AD, contact Rolls-Royce plc, P.O. Box 31, Derby DE24 8BJ, UK; phone: 44 (0) 1332 242424; fax: 44 (0) 1332 249936.

(4) You may view this service information at FAA, Engine & Propeller Directorate, 12 New England Executive Park, Burlington, MA. For information on the availability of this material at the FAA, call 781-238-7125.

(5) You may view this service information at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Burlington, Massachusetts, on June 5, 2013.

Colleen M. D'Alessandro,  
Assistant Manager, Engine & Propeller Directorate,  
Aircraft Certification Service.

[FR Doc. 2013-14922 Filed 06/21/2013 at 8:45 am; Publication Date: 06/24/2013]